CONSERVATION STATUS OF GLACIATED POTHOLE PRAIRIE IN MONTANA

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INTRODUCTION

A significant number of small wetlands, primarily marshes and ponds are found in the glaciated prairie region of central North America (Mitsch and Gosselink 1986). Pothole topography occurs in areas which were covered with glacial drift deposits during the middle advances of the Wisconsin glaciation. Glaciated pothole prairie is well represented in southern Alberta, southern Saskatchewan, extreme southwestern Manitoba, northeastern Montana, northern and east-central North Dakota, eastern South Dakota, and small portions of western Minnesota and northwestern Iowa (Stewart and Kantrud 1971). This region, because of its numerous ponds, small lakes, and marshes and fertile uplands is described as being one of the most important wetland regions in the world (Weller 1981). It provides migration and breeding habitat for numerous species of birds including 60-70% of the total continental duck production in North America (Redelfs 1983). One half of the prairie potholes in the United States were drained by 1950, and 48,000 acres of prairie wetlands are currently being lost annually (Redelfs 1983). In much of the area where prairie wetlands remain intact, the grassland surrounding them has been plowed for farmland or seriously degraded by livestock grazing (personal observation, Bonnie Heidel, North Dakota Natural Heritage Program, personal communication).

Although Montana is on the periphery of the glaciated prairie pothole region, there are five significant areas of the state where this ecosystem occurs. These are: 1) the Comertown region of northeastern Sheridan Co., 2) the Loring area in northern Phillips and northeastern Blaine counties, 3) the Sweetgrass Hills area in northwestern Liberty, northern Toole, and northeastern Glacier counties, 4) the East Front area along the Front Range of the Rocky Mtns. from Glacier Park south to the Sun River in western Glacier, Pondera, Teton, and Lewis and Clark counties, and 5) the Ninepipe area in central Lake Co., west of the Continental Divide (Figure 1). This last area is not generally considered part of the glaciated pothole region as it is not in the Great Plains Floristic Province; however, it is an area of semi-arid grasslands and was glaciated by the continental ice sheet which flowed down the Rocky Mountain Trench from Canada (Alt and Hyndman 1972).

METHODS

In July, 1984 and July, 1987 I surveyed all of these regions except the East Front for examples of intact prairie pothole ecosystem. I identified areas with high concentrations of wetlands from USGS topographic maps and inspected these areas on foot and from a car.

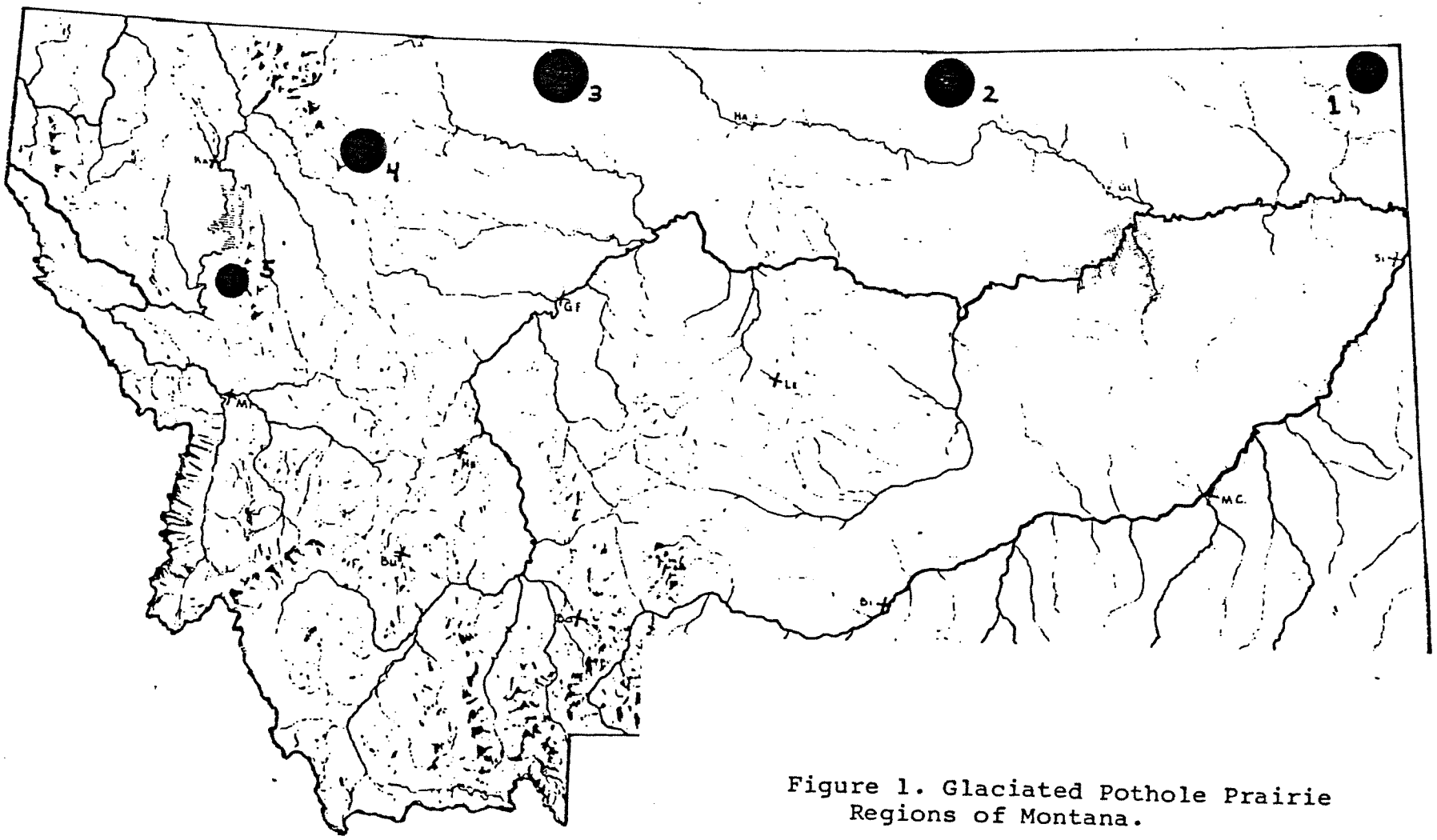


Figure 1. Glaciated Pothole Prairie Regions of Montana.

1. Comertown Area
2. Loring Area
3. Sweetgrass Hills Area
4. East Front Area
5. Ninepipe Area

RESULTS

Comertown Area. Most of the land in northeastern Sheridan County is very level and has been plowed for farming small grain crops. The region directly north of the old townsite of Comertown is hillier than the surrounding area and has remained relatively undisturbed. Although some of the wetlands in northeastern Sheidan County have not been drained and plowed, it is only the area just north of Comertown where a large continuous tract of native prairie still occurs. A detailed description of this area is presented in the preserve design package for Comertown Pothole Prairie (Lesica 1987).

Loring Area. The glaciated pothole prairie in this area occurs on relatively gentle terrain, and the majority of the grasslands on deeded land have been plowed and are being farmed for small grain. Much of the remaining native prairie has been severely overgrazed. Wetland diversity in this region seems to be lower than either further to the east or the west. I visited the Loring Area in 1984. At that time I found only one site, predominantly on private land, that I felt was representative of presettlement pothole prairie in that region. I recall that there was another large, unplowed pothole site on public land administered by BLM, but the notes on this site have been lost.

The Joiner Coulee Pothole Prairie is an area of approximately 7000 acres in western Phillips County 20 miles northwest of Dodson (T33N R26E Sec 1, 12, 13, 24 N1/2; T33N R27E Sec 5, 6, 7, 18, 19 N1/2; T34N R26E Sec 36; T34N R27E Sec 31, 32; see Fig. 2).

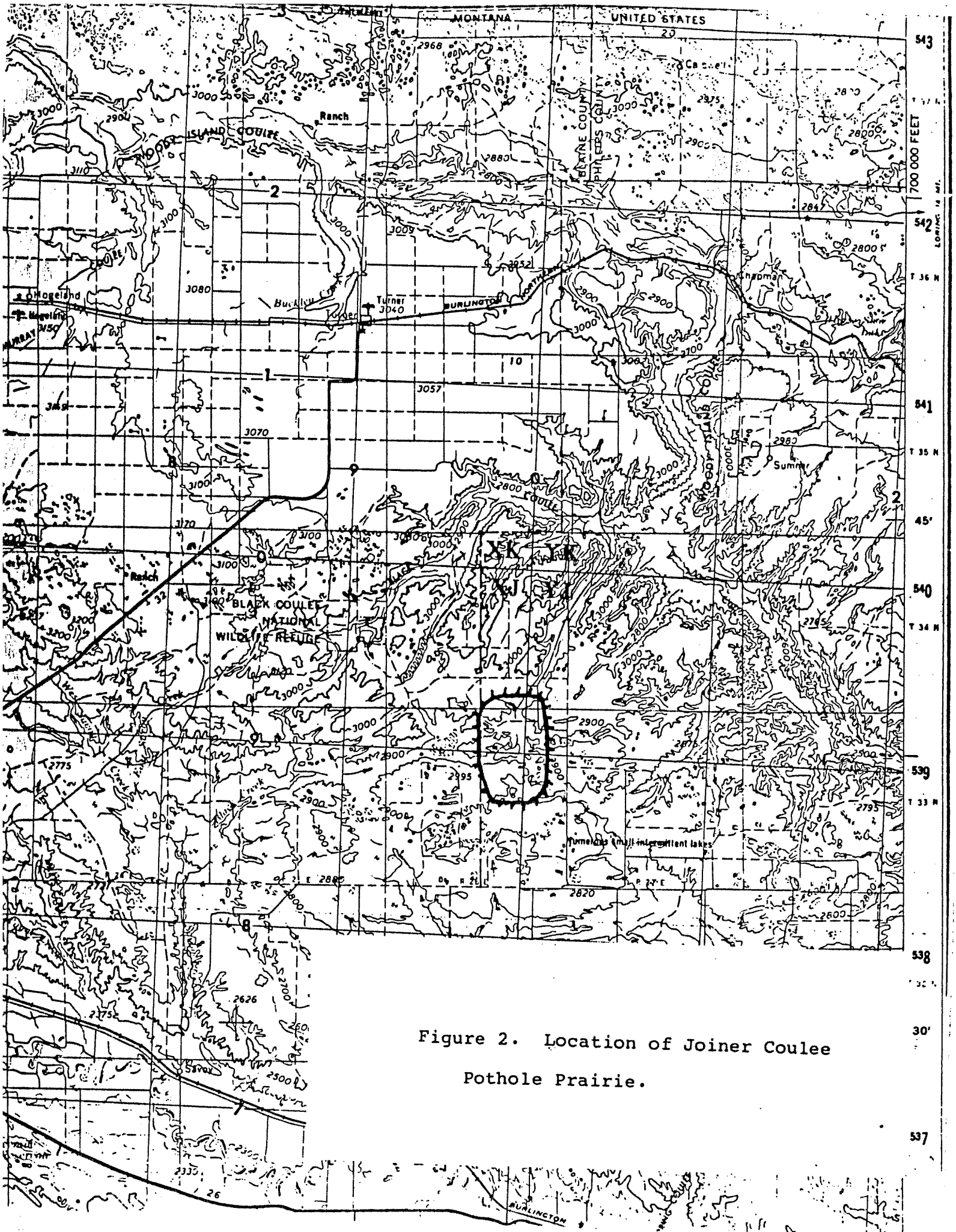


Figure 2. Location of Joiner Coulee Pothole Prairie.

Grasslands in the area are dominated by needle-and-thread (Stipa comata), sandberg's bluegrass (Poa secunda), and junegrass (Koelaria cristata). Common forbs include winterfat (Ceratoides lanata) and dense clubmoss (Selaginella densa). High coverage values for increasers such as junegrass and clubmoss indicate a degree of overgrazing; however, 1984 was the third year of a regional drought, and I do not know how this affected the condition of grasslands.

Examples of Class I, II, and III ponds (see Stewart and Kantrud 1971) are present at this site. I observed what appeared to be permanent ponds at this site; however, my notes on species composition of the wetlands indicate that typical deep marsh vegetation, usually associated with permanent ponds, was not present. A list of wetland vascular plants observed at this site is presented in Table 1. My notes show that Elodea longivaginata was observed at this site; however, I did not collect a specimen, so the report is somewhat in doubt. Elodea longivaginata is a rare plant in Montana, presently known only from Phillips and Liberty counties. Dwarf wooly-heads (Psilocarphus brevissimus) occurs in Class I ponds in this area. It is listed as rare in Montana (Lesica et al. 1984) and is currently known from four locations in the state (Cascade, Phillips, and Sanders cos.). It is a very inconspicuous plant and may be more common than is currently known.

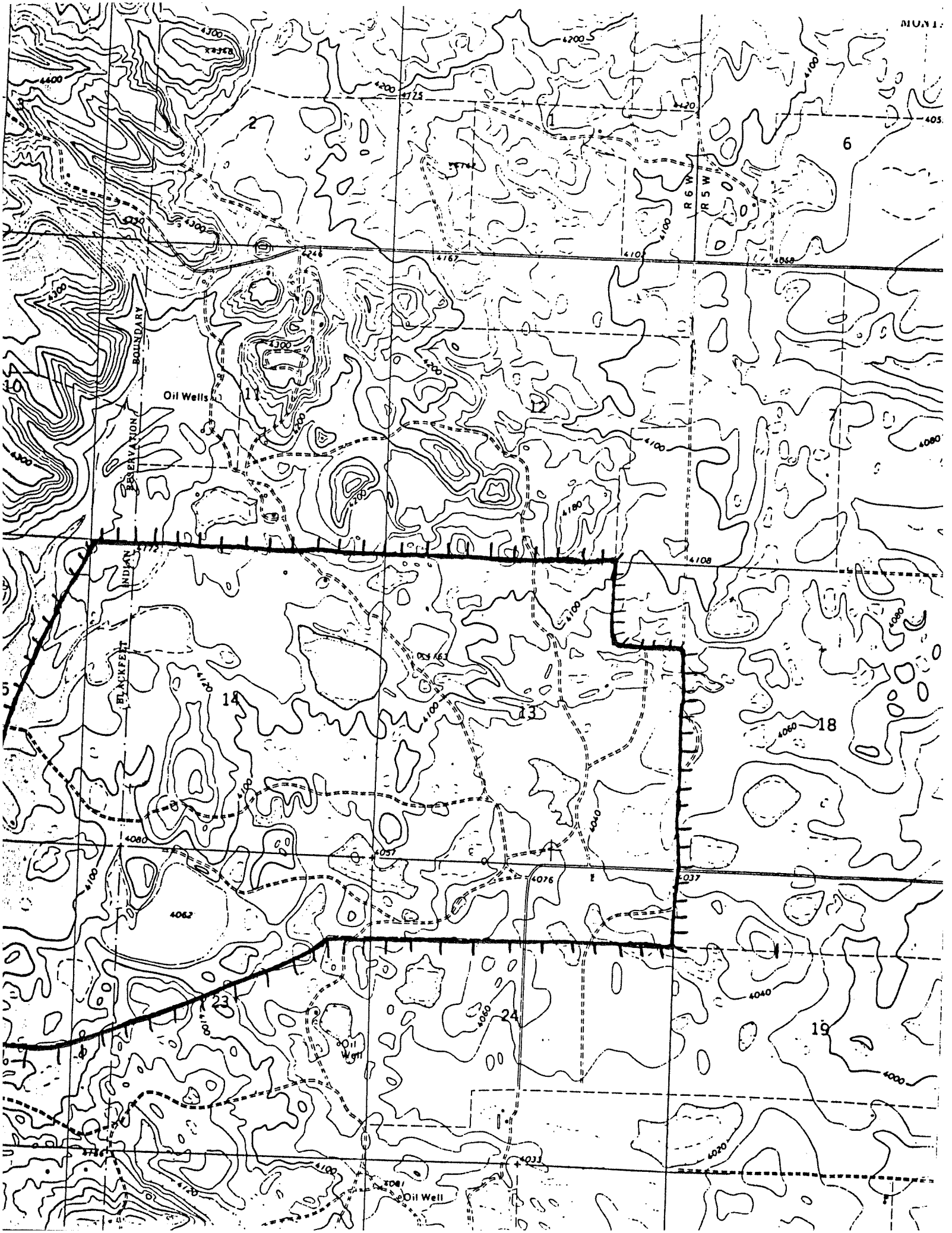
Table 1. Vascular plants observed in the Joiner Coulee Pothole Prairie wetlands, 13 July 1984.

Alopecurus aequalis
Alopecurus carolinianus
Beckmannia syzigachne
Chenopodium glabrum
Eleocharis palustris
Elodea longivaginata
Grindellia squarrosa
Hordeum jubatum
Limosella aquatica
Myriophyllum spicatum
Navarettia intertexta
Plagiobothrys scouleri
Poa palustris
Potamogeton spp.
Potentilla paradoxa
Psilocarphus brevissimus
Ranunculus aquatilis
Rumex crispus
Sagittaria cuneata
Veronica peregrina

Sweetgrass Hills Area. Throughout much of this region the wetlands have been lost to agricultural development and oil and gas development. This loss is particularly apparent east of the Sweetgrass Hills. Development of oilfields in the Kevin-Sunburst area and north of Cutbank has degraded much of the wetlands. Extensive draining and plowing has also occurred. I was able to find only one area east of the Sweetgrass Hills where extensive native pothole prairie still occurs.

The Big Rock Coulee Pothole Prairie is an area of approximately 2,000 acres 23 miles north of Cut Bank (T37N R6W Sec 13, 14, 15 SE1/4, 22 NE1/4, 23 N1/2, 24 N1/4; see Figure 3). Grasslands are dominated by thick-spike wheatgrass (Agropyron dasystachum), junegrass, and sandberg's bluegrass. Idaho fescue (Festuca idahoensis) is common on cooler slopes with deeper soils. Common forbs include fringed sagewort (Artemisia figida), western mugwort (Artemisia ludoviciana), snakeweed (Gutierrezia sarothrae), and Hood's phlox (Phlox hoodii). Some swales and cool slopes are dominated by snowberry (Symphoricarpos occidentalis) and kentucky bluegrass (Poa pratensis). Examples of Class I, II, III, and V (see Stewart and Kantrud 1971) are present at this site. Vascular plants associated with the wetlands on Big Rock Coulee Pothole Prairie are presented in Table 2.

The grasslands on this site are being grazed by livestock, and the effects of past grazing are apparent. Species which increase under grazing, such as junegrass, fringed sagewort,


Oil Wells
INDIAN RESERVATION BOUNDARY
BLACKFEET
Oil Well
Oil Well
R6W
R5W
MONT.

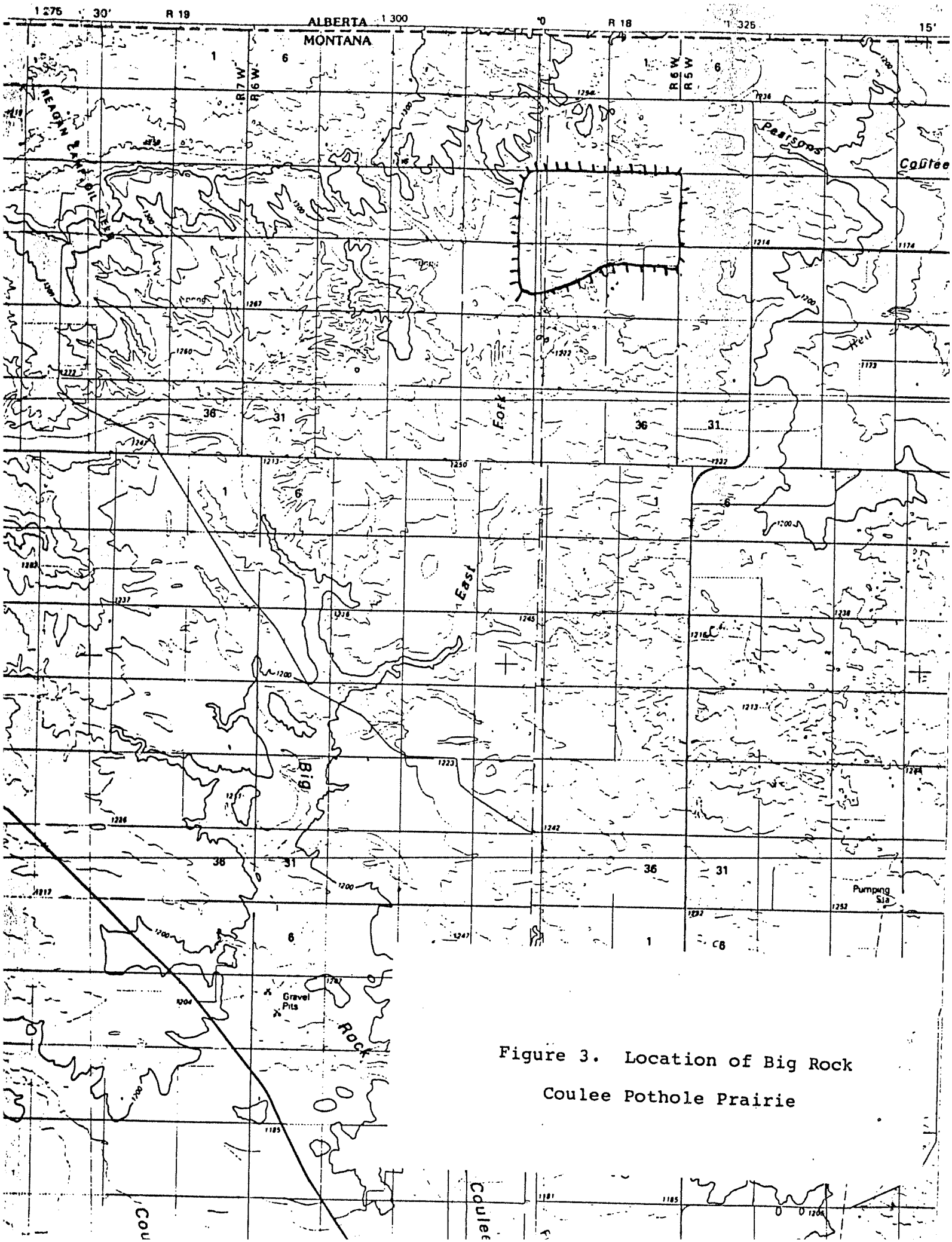


Figure 3. Location of Big Rock Coulee Pothole Prairie

Table 2. Vascular plant species associated with wetland areas in the Big Rock Coulee Pothole Prairie; 20 July 1987.

Agrostis alba
Alopecurus aequalis
Aster brachyactis
Beckmannia syzigachne
Calamagrostis canadensis
Calamagrostis inexpansa
Carex atherodes
Carex praegracilis
Chenopodium glabrum
Deschampsia cespitosa
Distichlis stricta
Eleochais asicularis
Eleocharis palustris
Epilobium glaberrimum
Erigeron loncophyllus
Glaux maritima
Grindelia squarrosa
Hordeum jubatum
Juncus balticus
Juncus bufonius
Kochia scoparia
Mentha arvensis
Polygonum amphibium
Polygonum ramosissimum
Potentilla anserina
Potentilla biennis
Puccinellia distans
Ranunculus cymbalaria
Rorippa obtusata
Rumex maritimus
Salicornia rubra
Sanguisorba occidentalis
Scirpus americanus
Scirpus maritimus
Scirpus validus
Sisyrinchium angustifolium
Stachys palustris
Veronica peregrina

snakeweed, and Hood's phlox, are almost certainly more common than they would be in near-pristine grasslands. Fortunately, there do not appear to be any serious exotic weed problems. Grasslands could probably return to better condition under reduced grazing presure. To some extent the condition of the grasslands may be the result of the drought which has prevailed in the area for the past six years (Weaver and Albertson 1956). The wetland diversity at this site is good, containing examples of most types which are present in the Sweetgrass Hills area.

Glaciated pothole prairie is also present in the Sweetgrass Hills between East Butte and Middle Butte around the community of Whitlash. The topography is hillier than that of areas to the west, and agricultural development has not been so prevalent. Oil and gas development is occurring at the northern edge of this region. Grasslands on ridges and warm slopes are dominated by needle-and-thread, western wheatgrass (Agropyron smithii), thread-leaf sedge (Carex filifolia), and junegrass. Common forbs include hairy golden-aster (Chrysopsis villosa), tufted fleabane (Erigeron caespitosus), Missouri goldenrod (Solidago missouriensis), and fringed sagewort. Mesic slopes are dominated by rough fescue (Festuca scabrella), Idaho fescue, bluebunch wheatgrass (Agropyron spicatum), and thread-leaf sedge. Common forbs are western mugwort, prairie smoke (Geum triflorum), silky lupine (Lupinus sericeus), and northern bedstraw (Galium boreale).

Two areas in the Whitlash region still support examples of native prairie pothole vegetation. These are the Chicago Lake Pothole Prairie (T36N R3E Sec 13 S1/2, 23 E1/2, 24, 25 N1/2; T36N R4E Sec 19 W1/2, 30 NW1/4) and the Morgan Hill Pothole Prairie (T37N R4E Sec 21 SE1/4, 22 SW1/4, 27 N1/2, 28 N1/2; see Fig. 4). At least one section of the Chicago Lake area is public land managed by the U.S. Fish and Wildlife Service as a waterfowl production area. Grasslands on the public land are in good condition and have not been grazed heavily in the recent past. Grasslands under private ownership are in fair condition. Wetland diversity in the Chicago Lake area is low. I observed only Class I, II, and III ponds; however, I did not visit Chicago Lake itself. Vascular plant species associated with the Chicago Lake Pothole Prairie wetlands are presented in Table 3. Grasslands in the Morgan Hill area are in good condition, but wetland areas are less diverse than the Chicago Lake area. Permanent ponds occur in nearby areas, but the surrounding uplands have been degraded by agricultural and oil development.

Ninepipe Area. Much of the wetlands in this region are owned by or have easements held by the Montana Department of Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service. Wetlands in this region are very rich and diverse. A number of wetland plant species considered rare in Montana have been found in this region. These include heterocodon (Heterocodon rariflorum), flowering quilwort (Lilaea scilloides), Guadalupe water-nymph (Najas guadalupensis), Columbia water-meal (Wolffia

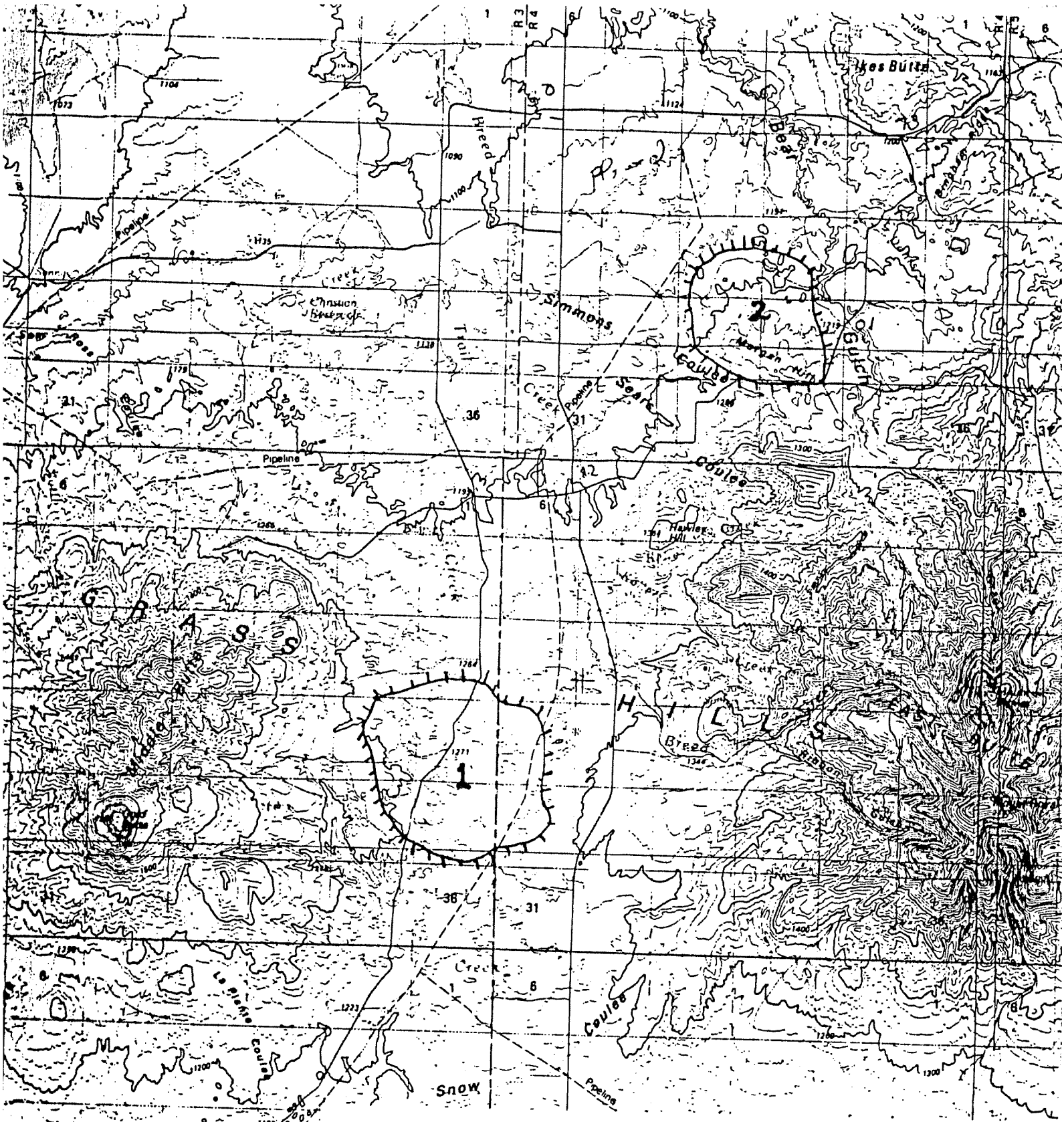


Figure 4A. Location of (1) Chicago Lake Pothole Prairie and (2) Morgan Hill Pothole Prairie

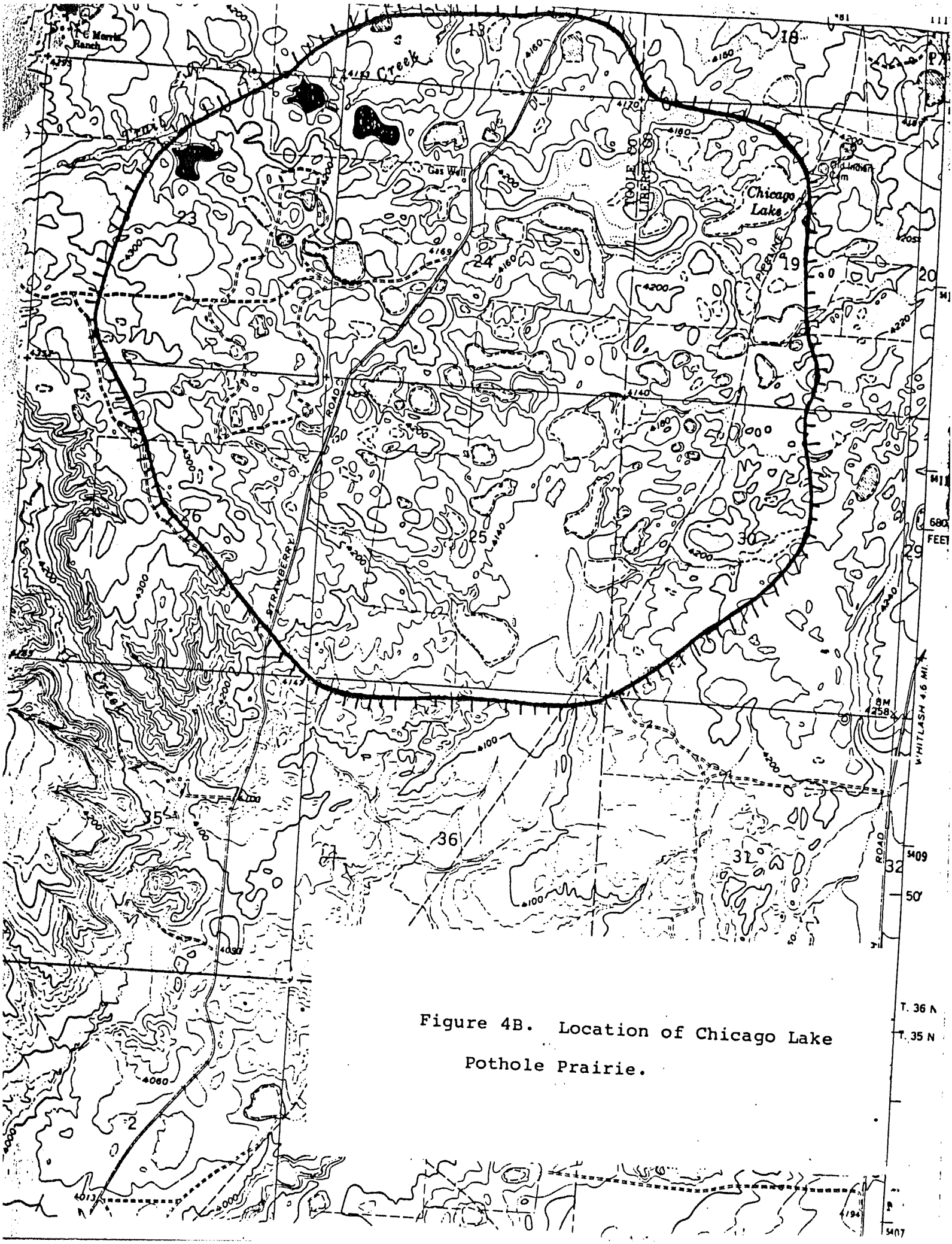


Figure 4B. Location of Chicago Lake Pothole Prairie.

Table 3. Vascular plant species observed in the wetlands of Chicago Lake Pothole Prairie, 17 July 1987.

Alisma plantago-aquatica
Alopecurus aequalis
Beckmannia syzigachne
Calamagrostis canadensis
Carex atherodes
Carex nebrascensis
Chenopodium glabrum
Deschampsia cespitosa
Eleocharis asicularis
Eleocharis palustris
Grindelia squarrosa
Hordeum jubatum
Juncus balticus
Juncus tenuis
Mentha arvensis
Microseris nutans
Myriophyllum spicatum
Poa palustris
Polygonum amphibium
Polygonum persicaria
Potamogeton richardsonii
Potentilla anserina
Potentilla paradoxa
Puccinellia distans
Rumex crispus
Rumex maritimus
Sanguisorba occidentalis
Stachys palustris

columbiana), and spotted water-meal (Wolffia punctata) (Lesica et al. 1984). A list of wetland and aquatic vascular plants observed in this region is presented in Table 4. Presettlement upland vegetation was dominated by rough fescue, Idaho fescue, and bluebunch wheatgrass. Unfortunately, agricultural development and habitat degradation due to livestock grazing have completely altered upland areas surrounding the wetlands. Areas which have not been plowed have lost many important native components and have serious exotic weed infestations. I was unable to locate any examples of pothole prairie even approaching native condition.

CONCLUSIONS

The pothole prairie ecosystem has largely been destroyed or severely altered throughout the United States. In Montana, few large areas of this ecosystem still remain in presettlement condition. Most of the area has been fragmented or destroyed by agricultural practices or mineral development. The importance of protecting diversity at the ecosystem level is generally recognized by conservation biologists. The existence of scattered wetlands in a mosaic of agricultural fields and native grasslands will probably not maintain higher order ecological processes and species interactions over long periods of time (Pickett and Thompson 1978, Wilcox and Murphy 1985, Wilcove 1987, Noss 1987). The remaining areas of Montana's pothole prairie continue to be threatened by agricultural and oil and gas

Table 4. Vascular plant species observed in the wetlands of the Ninepipe Prairie Pothole region, June 30-July 1, 1987.

Agrostis alba
Agrostis scabra
Alisma plantago-aquatica
Alopecurus aequalis
Beckmannia syzigachne
Bidens cernua
Callitriche hermaphroditica
Callitriche heterophylla
Carex athrostachya
Carex bebbii
Carex lanuginosa
Carex rostrata
Carex stipata
Catabrosa aquatica
Ceratophyllum demersum
Chenopodium glabrum
Deschampsia cespitosa
Elatine californicum
Eleocharis asicularis
Eleocharis ovata
Eleocharis palustris
Elodea sp.
Elymus cinereus
Epilobium glaberrimum
Galium trifidum
Geum allepicum
Geum macrophyllum
Glyceria borealis
Glyceria grandis
Gnaphalium palustre
Gratiola neglecta
Hordeum brachyathereum
Hordeum jubatum
Iris pseudacorus
Juncus balticus
Juncus bufonius
Juncus tenuis
Lemna minor
Lemna trisulca
Limosella aquatica
Lycopus uniflorus(?)
Marsilea vestita
Mentha arvensis
Myosotis laxa
Myriophyllum spicatum
Phalaris arundinacea
Poa compressa
Poa palustris
Plagiobothrys scouleri
Polygonum amphibium
Polygonum lapathifolium
Polypogon monspeliensis
Potamogeton diversifolius
Potamogeton gramineus
Potamogeton pectinatus
Potamogeton pusillus
Potamogeton richardsonii
Potamogeton zosteriformis
Puccinellia distans
Ranunculus aquatilis
Ranunculus cymbalaria
Ranunculus sceleratus
Ranunculus pensylvanicus
Rorippa islandica
Rumex crispus
Rumex maritimus
Rumex salicifolius(?)
Sagittaria cuneata
Sanguisorba occidentalis
Scirpus acutus
Scirpus maritimus
Spergularia marina
Spirodela trisulca
Typha latifolia
Utricularia vulgaris
Veronica americana
Veronica peregrina
Wolffia columbiana
Wolffia punctata

development. Large examples of pothole prairie should be protected throughout the state in order to protect the biological diversity inherent in this rapidly vanishing ecosystem.

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